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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/593,220	09/18/2006	Masanori Hashiba	2418.99US01	7045
7590 09/14/2010				
Douglas J Christensen Patterson Thuenste Skaar & Christensen 4800 IDS Center 80 South 8th Street Minneapolis, MN 55402				
EXAMINER				
BLADES, JOHN A				
ART UNIT		PAPER NUMBER		
1791				
MAIL DATE		DELIVERY MODE		
09/14/2010		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/593,220

Applicant(s)

HASHIBA ET AL.

Examiner

JOHN BLADES

Art Unit

1791

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 April 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 5-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SI/22)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date 02/05/10

DETAILED ACTION

Claims 1-3 & 5-7 are pending as amended on 04/19/10.

Response to Amendment

1. This non-final action is a response to the amendment filed on April 19, 2010.

Claims 1 & 5 have been amended as a result of the previous non-final action. Claim 7 has been added.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. **Claims 1-7** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. With regard to **claim 1**, the original specification does not describe that the [apparent? bulk?] density of the base material prepared for the compression molding step is 0.5 g/cm³ or more, but that the [apparent] density of the *molded* base material has this density.

Claim Rejections - 35 USC § 103

4. **Claims 1-3 & 5-7** are rejected under 35 U.S.C. 103(a) as being unpatentable over *Mukai et al.*, JP 09-169897 in view of *Bopp et al.*, US 2003/0038405 and further in view of *Kashiwai et al.*, JP 2001-303489.
5. Mukai teaches the compression molding of a mat composed of aliphatic polyester fibers (such as PLA, [0010]) with woody fibers, forming a molded product with high heat strength and minimal environmental load; this molding occurs at a temperature above the melting point of the resin (throughout, see abstract). Mukai does not expressly disclose the use of an *inorganic* filler (*such as talc*), or *holding the product at or near a certain temperature to crystallize the polylactic acid*. However, Bopp teaches the incorporation of a nucleation agent – i.e. talc @ about 0.1+ wt% – as filler in PLA material, in order to promote crystallization when molding a sheet of this material near its crystallization temperature (throughout, e.g. [0012, 0032]). It would have been obvious to one of ordinary skill in the art at the time of the instant invention to combine the teachings of Bopp with the method of Mukai, to increase the heat resistance of the molded article [0002-0003].
6. Though Mukai & Bopp do not teach preparation of base material *in a ratio of wood:polymer that ranges from 7:3 to 5:5 by weight* – as cited, Mukai does teach a range of 5:100 to 500:100, which encompasses the claimed range – Kashiwai teaches a 6:4 to 4:6 wood:polymer range (abstract) for combining these ingredients that is similar to the claimed range with substantial overlap. It would have been obvious to one of ordinary skill in the art at the time the invention was made to practice the process of

Mukai & Bopp with the teachings of Kashiwai. The rationale to do so would have been that this would predictably result in a molded product that corresponds to an appropriate density or cost of materials. Further, it has been held that where claimed ranges overlap or lie inside ranges disclosed by the prior art, a *prima facie* case of obviousness exists. See MPEP 2144.05(I).

7. The obvious method formed from the combined teachings of these references would inherently reach complete crystallization in the desired time frame (Applicants have disclosed that the term "a crystallization rate of 100%" will be taken to mean a state in which the "crystallizable parts" of a polylactic acid are entirely crystallized). This can be accomplished by applying the teachings of Bopp, which states that increasing crystallization is preferable for increasing heat resistance, this crystallization can be accomplished in commercially reasonable time frames by holding a molded mat near a crystallization temperature in the range of 90°C to about 150°C [0016], the ideal value depending on a variety of known, easily controlled factors, including lactic acid enantiomer ratio, nucleating agents, and thermal history of the polymer, i.e., time held at the crystallization temperature (throughout, e.g. [0006, 0030, 0032]). It is believed that with all other things being equal, this combination would naturally result in a molded product with the claimed density. Regardless, when the general conditions of the claimed process have already been disclosed in the prior art, it would have been obvious for one of ordinary skill to discover optimum values or workable ranges for said process through routine experimentation. See MPEP 2144.05(II).

Response to Arguments

8. Applicants' arguments, see response, "The Cited References Fail to Teach, Disclose or Suggest All Claim Limitations," filed April 19, 2010, with respect to claim 1 have been fully considered and are not persuasive. Bopp provides the teaching that typically, crystallizable PLA resins are known to crystallize in commercially reasonable time frames when held somewhere the range of 90°C to about 150°C, depending on a variety of factors [0016]. Applicant has argued that a temperature value for the thermoforming mold (80°C or below [0012]) is not even close to the crystallization temperature in the claimed method, but this argument is not relevant to the proposed combination, as it refers to a thermoforming, or quenching step, preferably conducted below the T_g of the resin [0021]. The rejection was based on Bopp's teaching which concerned effecting crystallization during a heating step, wherein the temperature is held between the T_g and the T_m of the resin. It is further noted that Applicant has originally disclosed that the term "a temperature close to a crystallization temperature" will be taken to mean a temperature in the range of the crystallization temperature $\pm 20^\circ\text{C}$, which does not rule out the 80°C value as being not even close.
9. Applicants' arguments, see response, "The Cited References Teach Away from the Proposed Combinations of References," filed April 19, 2010, with respect to the rejection of claim 1 have been fully considered and are not persuasive. The notion that Mukai teaches away from combination with Bopp is faulty. Mukai seeks to improve the heat resistance of a molded article having PLA fibers, and achieves this by incorporating "highly heat-resistant biodegradable reinforcing fibers" such as "natural

fiber.” Bopp then teaches that the heat resistance of a molded PLA article can also be improved by crystallizing the melted PLA. No teaching is present in these references that would have led one of ordinary skill away from incorporating the teachings of Bopp; to the contrary, this would have predictably improved upon the very same goal with which Mukai was originally concerned.

10. Modifying an ingredient ratio of natural fiber : polylactic acid from the broad range as taught by Mukai (5:100 to 500:100) into what amounts to a narrower range as taught by Kashiwai (4:6 to 6:4, or ~66:100 to 150:100) – which lies completely within said broad range – is not considered teaching away. No teaching exists that would have led one of ordinary skill away from the claimed values. It can even be argued that the Kashiwai reference is not needed to render the claimed ranges obvious, since Applicants' ranges lie within the ranges which were taught by Mukai (see MPEP 2144.05(I) as cited previously). The similar, overlapping ranges of both Kashiwai and instant claim 1 (5:5 to 7:3, or 100:100 to ~233:100) are both wholly encompassed by the range of Mukai and are considered obvious. Further, the claimed ratios of natural fiber to PLA do not produce any sort of unexpected result which one of ordinary skill in the art would not have arrived at through routine experimentation with the prior art.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN BLADES whose telephone number is (571)270-7661. The examiner can normally be reached on M-Th (6:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Katarzyna Wyrozebski can be reached on (571)272-1127. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J.B./
Patent Examiner

/KHANH NGUYEN/
Primary Examiner, Art Unit 1791